TECHNICAL MEMORANDUM

LANDAU ASSOCIATES
ENVIRONMENTAL | GEOTECHNICAL | NATURAL RESOURCES

TO: Carl Bach, The Boeing Company

FROM: Kristy J. Hendrickson, P.E, and Colette Griffith

DATE: May 14, 2010

RE: WORK PLAN ADDENDUM NO. 2
STORM DRAIN STRUCTURE AND SURFACE CLEANUP
NORTH BOEING FIELD
SEATTLE, WASHINGTON

This technical memorandum is Addendum No. 2 to the January 15, 2010 *Work Plan, Storm Drain Structure and Surface Cleanup, North Boeing Field, Seattle, Washington* (Work Plan, Landau Associates 2010). This addendum is prepared in response to polychlorinated biphenyl (PCB) and asbestos being found on flanges inside of the 3-322 building during excavation activities performed at North Boeing Field (NBF) under the Work Plan. This addendum provides information on how the flanges inside of the 3-322 building will be removed and managed as PCB and asbestos waste. The following are included as attachments to this addendum are: laboratory analytical results from asbestos characterization sampling; laboratory analytical results from PCB characterization sampling; and photographs of a typical flange found inside of the 3-322 building (Figure 1). PCBs were detected in flange materials at concentrations greater than or equal to 50 milligrams per kilogram (mg/kg) and, as such, removal and disposal of the flanges will be conducted in accordance with the Toxics Substances Control Act (TSCA) under the requirements of the risk-based cleanup procedures for the cleanup and disposal of PCB remediation waste [40 C.F.R. § 761.61(c)]. Although PCBs were detected in the caulking around the collars of the flanges located in the 3-322 building, there is no pathway from the flanges to the storm drain system at NBF, and the flanges are not located in areas where there is or may have been the potential for PCBs to contaminate soil or groundwater in the vicinity.

REMOVAL OF STEEL FLANGES

There are 15 steel flanges inside the 3-322 building that historically were connected to fuel or utility piping and are no longer in use. The flanges are typically found in groups of three, as shown on the upper photograph of Figure 1. Asbestos and PCB characterization sampling was initiated after excavation activities described in the Work Plan exposed some of the abandoned fuel piping outside of the 3-322 building. The laboratory analytical results from this characterization sampling are attached to this addendum. The flange covers will not be removed to avoid disturbing the asbestos gaskets.

Explosive levels of gases are not anticipated inside the flanges because the building drawings indicate the lines were flushed at the time they were abandoned and explosive levels were not found in the fuel piping outside of the building. However, contracted personnel will drill through the top of each flange to verify that the levels of explosive gases are within an acceptable range. The flange cover will not be removed to avoid exposing the asbestos gasket surfaces. There is caulking around the collar of each flange that, based on sample results, is expected to contain PCBs greater than 50 mg/kg. The PCB caulking and underlying fiberboard will be removed by the contractor and placed into plastic bags. After the PCB caulking has been removed from all of the flanges, the plastic bags will be placed into a lined roll-off box to be managed as TSCA waste. There are two lined roll-off boxes remaining onsite from other TSCA removal activities described in the Work Plan that will be used. The roll-off boxes will be shipped to the Waste Management NW landfill in Arlington, Oregon, a chemical waste landfill permitted to accept TSCA waste under 40 C.F.R. § 761.75.

Following removal of the caulking around the flange collars, the contractor will cut off the steel pipe flush with the building floor using cold cut methods. In the case a flange is located with a concrete collar, the collar will be chipped away to allow for the flange to be removed. The flange and all associated parts will be placed into Department of Transportation (DOT)-approved shipping containers and managed as TSCA waste; these materials will also be managed in accordance with asbestos disposal guidelines. Containers will be shipped to the Waste Management NW chemical waste landfill in Arlington, Oregon. After the flanges have been removed, the contractor will backfill the hole in the floor with concrete to create an even level with the building grade.

SCHEDULE

Boeing plans to begin removal of the steel flanges inside the 3-322 building on May 18, 2010 while operations in the 3-322 building are shut down for the week. It is expected that removal activities will take 3 to 4 days to complete. Documentation of removal activities will be provided in the Storm Drain Structure and Surface Cleanup Report.

REFERENCES

Landau Associates. 2010. *Work Plan, Storm Drain Structure and Surface Cleanup, North Boeing Field, Seattle, Washington*. January 15.

Typical Flange Configuration

Caulk material typically located around flange collar

LANDAU ASSOCIATES

North Boeing Field Seattle, Washington	**Steel Flange Removal Inside the 3-322 Building**	Figure 1

Laboratory Data

Good Faith Inspection for Asbestos

ASBESTOS IMPACTED BY THIS SCOPE OF WORK

To: Jennifer Parsons
9L-22-N410 EHS PROJECT MGMT NORTH

Sent: 4/9/2010

cc: Scott Darlington
Northwest Regulated Materials Management

Subject: Asbestos Goodfaith Survey for Building 03-322.1, All Four test cells

Project No: 3-322RemedSoil

MPORTANT: **Since asbestos containing materials are present in the subject project work area, abatement measures must be taken prior to the start of any work. Contact Scott Darlington 206-544-8441 or NORMM site lead referenced below as soon as possible to discuss abatement options.**

Inspection: A good faith determination for the presence of asbestos was conducted for the above listed project on 4/8/2010 by Andy Pantoja(AHERA Building Inspector # 104182 expires 9/2/2010), NORMM Asbestos Crew Lead. If you have any questions regarding this survey Andy Pantoja can be reached at 206-579-6615.

Scope: The scope of work is as follows:
Pipe Removal Scope: Remove exposed metal former fuel piping from north side of building. And potentially remove 3 flanged fuel pipe stubs from each of four test cells inside the 3-322. We are anticipating their is a gasket inside the pipe flanges which will be exposed during pipe removal. Larger Remediation project is soil removal between 3-322 and 3-302 and gravel areas to west.

NOTE: **If the above scope of work description does not reflect the actual work and materials to be impacted, if the planned scopre of work changes, if the referenced project document numbers and or drawing dates have changed, please contact the undersigned for possible further investigation.**

Results: After reviewing the scope of work, existing asbestos survey information, and conducting a visual inspection, Boeing Northwest Regulated Materials Management (NORMM) has determined that asbestos-containing materials (ACMs) shall be impacted by the stated scope of work. NORMM cannot access the flange gasket at this time so we must assume positive for asbestos. Contact Andy Pantoja, Boeing NORMM inspector @ 206-579-6615 for NORMM support.
NOTE: NORMM previously sampled the caulking material for asbestos and the results were negative for asbestos. NORMM also sampled for heavy metals and results were positive for lead, cadmium and chromium.

If there are other suspect materials impacted by this work that have not been identified by this letter or existing survey information or material discovered that is inaccessible during normal building use, work that would disturb the unknown material must be halted immediately and those detailed below must be contacted immediately.

There remains the possibility that suspect materials do exist, but were hidden or inaccessible. Per the Puget Sound Clean Air Agency (PSCAA) Article 4.02 Asbestos Survey Requirements (a) 4 'A summary of the results of the asbestos survey shall be posted by the property owner or the owner's agent at the work site'.

Good Faith Inspection for Asbestos

Washington State Dept. of Labor and Industries (L & I) requires that this determination be in written form, maintained by the building owner and given to whomever shall perform the work. Furthermore, the employer and or the building owner is to make this document available to their employees by posting this determination report conspicuously on the site while work is performed.

This survey is intended for informational purposes only, and restricted to the specified area. If any damage does occur to known or suspect asbestos containing material or should anyone question any other building material, work must stop immediately and Scott Darlington or myself should be contacted as soon as possible to ensure compliance with all applicable health, safety and environmental regulations.

The survey was performed to provide information in order to meet the AHERA asbestos sampling protocol as stated in 40 CFR 763.86. This sampling protocol is required for all asbestos surveys prior to renovation or demolition of a building under the Puget Sound Clean Air Agency, Regulation III, Section 4.
Please call if you have any questions or request additional information.

Leslie Gnagy
Northwest Regulated Materials Management
Asbestos Program Administrator
206-200-0252 Office/voice mail

Analytical Resources, Incorporated
Analytical Chemists and Consultants

May 7, 2010

Carl Bach
The Boeing Company
P.O. Box 3707, M/S 1W-12
Seattle, WA 98124-2207

RE: Project: 3-322 Flange Removal
ARI Job: QV36

Dear Carl:

Please find enclosed the original chain of custody (COC) record, sample receipt documentation, and analytical results for project referenced above. Analytical Resources, Inc. (ARI) received three solid samples in good condition on May 5, 2010.

The samples were analyzed for PCBs, as requested on the COC.

No analytical complications were noted.

Quality control analysis results are included for your review. Copies of the reports will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: QV36	Turn-around Requested: 72-hr	Page: 1 of 1	
ARI Client Company: BOEING	Phone:	Date: 5/5/10	Ice Present? Y
Client Contact: CARL BACH		No. of Coolers: 1	Cooler Temps: 0.8
Client Project Name: S-322 FLANGE REMOVAL			
Client Project #: 7KNBFREM	Samplers: J. PARSONS		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: RBS	Notes/Comments
S-322-NWCell-1	5/5/10	0840	S	1	X	
S-322-CELL2A-1	5/5/10	0910	S	1	X	
S-322-NWCell-2	5/5/10	0850	S	1	X	

Comments/Special Instructions
CC. Carl Back
Jay Parsons
Fred Wallace
Joe Flaherty
Dan Machut

Relinquished by: (Signature) Jennifer Parsons	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name: JENNIFER PARSONS	Printed Name: A. Volgardsen	Printed Name:	Printed Name:
Company: BOEING	Company: ARI	Company:	Company:
Date & Time: 5/5/10 1227	Date & Time: 5/5/10 1227	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Project Name: 3-322 Flange Removal

COC No(s): _____ (NA) Delivered by: Fed-Ex UPS Courier (Hand Delivered) Other: _____

Assigned ARI Job No: QV36 Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES (NO)

Were custody papers included with the cooler? (YES) NO

Were custody papers properly filled out (ink, signed, etc.) (YES) NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)..... 0.8

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 90877952

Cooler Accepted by: AV Date: 5/5/10 Time: 1227

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES (NO)

What kind of packing material was used? ... (Bubble Wrap) Wet Ice (Gel Packs) Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA (YES) NO

Were all bottles sealed in individual plastic bags? YES (NO)

Did all bottles arrive in good condition (unbroken)? (YES) NO

Were all bottle labels complete and legible? (YES) NO

Did the number of containers listed on COC match with the number of containers received? (YES) NO

Did all bottle labels and tags agree with custody papers? (YES) NO

Were all bottles used correct for the requested analyses? (YES) NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES (NO)

Were all VOC vials free of air bubbles? (NA) YES NO

Was sufficient amount of sample sent in each bottle? (YES) NO

Date VOC Trip Blank was made at ARI..... (NA) _____

Was Sample Split by ARI : (NA) YES Date/Time:_____ Equipment:_____ Split by:_____

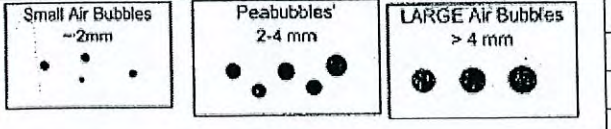
Samples Logged by: JP Date: 5/5/10 Time: 1245

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm"

Peabubbles → "pb"

Large → "lg"

Headspace → "hs"

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: 3-322-NWCell-1
SAMPLE

Lab Sample ID: QV36A
LIMS ID: 10-11027
Matrix: Solid
Data Release Authorized:
Reported: 05/07/10

QC Report No: QV36-The Boeing Company
Project: 3-322 Flange Removal
7KNBFREM
Date Sampled: 05/05/10
Date Received: 05/05/10

Date Extracted: 05/05/10
Date Analyzed: 05/06/10 18:12
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.02 g-as-rec
Final Extract Volume: 40 mL
Dilution Factor: 50.0
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	8,000	< 8,000 U
53469-21-9	Aroclor 1242	8,000	< 8,000 U
12672-29-6	**Aroclor 1248**	**8,000**	**70,000**
11097-69-1	**Aroclor 1254**	**8,000**	**75,000**
11096-82-5	Aroclor 1260	8,000	< 8,000 U
11104-28-2	Aroclor 1221	8,000	< 8,000 U
11141-16-5	Aroclor 1232	8,000	< 8,000 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	D
Tetrachlorometaxylene	D

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: 3-322-Cell2A-1
SAMPLE

Lab Sample ID: QV36B
LIMS ID: 10-11028
Matrix: Solid
Data Release Authorized:
Reported: 05/07/10

QC Report No: QV36-The Boeing Company
Project: 3-322 Flange Removal
7KNBFREM
Date Sampled: 05/05/10
Date Received: 05/05/10

Date Extracted: 05/05/10
Date Analyzed: 05/07/10 09:25
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.01 g-as-rec
Final Extract Volume: 40 mL
Dilution Factor: 4000
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	640,000	< 640,000 U
53469-21-9	Aroclor 1242	640,000	< 640,000 U
12672-29-6	**Aroclor 1248**	**640,000**	**12,000,000**
11097-69-1	**Aroclor 1254**	**640,000**	**15,000,000**
11096-82-5	Aroclor 1260	960,000	< 960,000 Y
11104-28-2	Aroclor 1221	640,000	< 640,000 U
11141-16-5	Aroclor 1232	640,000	< 640,000 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	D
Tetrachlorometaxylene	D

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: 3-322-NWCell-2
SAMPLE

Lab Sample ID: QV36C
LIMS ID: 10-11029
Matrix: Solid
Data Release Authorized:
Reported: 05/07/10

QC Report No: QV36-The Boeing Company
Project: 3-322 Flange Removal
7KNBFREM
Date Sampled: 05/05/10
Date Received: 05/05/10

Date Extracted: 05/05/10
Date Analyzed: 05/07/10 09:49
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.06 g-as-rec
Final Extract Volume: 40 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	790	< 790 U
53469-21-9	Aroclor 1242	790	< 790 U
12672-29-6	**Aroclor 1248**	**790**	**980**
11097-69-1	**Aroclor 1254**	**790**	**990**
11096-82-5	Aroclor 1260	790	< 790 U
11104-28-2	Aroclor 1221	790	< 790 U
11141-16-5	Aroclor 1232	790	< 790 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	110%
Tetrachlorometaxylene	87.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: MB-050510
METHOD BLANK

Lab Sample ID: MB-050510
LIMS ID: 10-11027
Matrix: Solid
Data Release Authorized:
Reported: 05/07/10

QC Report No: QV36-The Boeing Company
Project: 3-322 Flange Removal
7KNBFREM
Date Sampled: NA
Date Received: NA

Date Extracted: 05/05/10
Date Analyzed: 05/06/10 17:01
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g
Final Extract Volume: 40 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	160	< 160 U
53469-21-9	Aroclor 1242	160	< 160 U
12672-29-6	Aroclor 1248	160	< 160 U
11097-69-1	Aroclor 1254	160	< 160 U
11096-82-5	Aroclor 1260	160	< 160 U
11104-28-2	Aroclor 1221	160	< 160 U
11141-16-5	Aroclor 1232	160	< 160 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	86.2%
Tetrachlorometaxylene	76.0%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Solid

QC Report No: QV36-The Boeing Company
Project: 3-322 Flange Removal
7KNBFREM

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-050510	86.2%	51-127	76.0%	49-110	0
LCS-050510	81.2%	51-127	72.2%	49-110	0
LCSD-050510	86.5%	51-127	75.8%	49-110	0
3-322-NWCell-1	D	22-168	D	28-106	0
3-322-Cell2A-1	D	22-168	D	28-106	0
3-322-NWCell-2	110%	22-168	87.9%	28-106	0

Medium Level Control Limits
Prep Method: SW3550B
Log Number Range: 10-11027 to 10-11029

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: LCS-050510
LCS/LCSD

Lab Sample ID: LCS-050510
LIMS ID: 10-11027
Matrix: Solid
Data Release Authorized:
Reported: 05/07/10

QC Report No: QV36-The Boeing Company
Project: 3-322 Flange Removal
7KNBFREM
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 05/05/10

Date Analyzed LCS: 05/06/10 17:25
LCSD: 05/06/10 17:48
Instrument/Analyst LCS: ECD7/JGR
LCSD: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount LCS: 5.00 g-as-rec
LCSD: 5.00 g-as-rec
Final Extract Volume LCS: 40 mL
LCSD: 40 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	3100	4000	77.5%	3140	4000	78.5%	1.3%
Aroclor 1260	3360	4000	84.0%	3470	4000	86.8%	3.2%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	81.2%	86.5%
Tetrachlorometaxylene	72.2%	75.8%

Results reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.